

1 **REMARKS**

2 Applicant respectfully requests allowance of the subject application.  
3 Claims 1-44 and 55-63 are pending. Claims 1, 13, 19, 29 and 37 are amended.  
4 Claims 45-54 are cancelled. Claims 55-63 are new. In view of the following  
5 remarks, Applicant respectfully requests that the rejections be withdrawn and the  
6 application be forwarded along to issuance

7  
8 **Claim Objections**

9 Claim 48 is cancelled, thereby obviating the objection.

10  
11 **§§ 102(b) and 103 Rejections**

12 Claims 1-3, 5, 6, 13-16, 18, 19, 22, 23, 29, 30, 32, 37-40 and 45-59 stand  
13 rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No.  
14 5,815,585 to Klippel (hereinafter "Klippel"). Claims 4, 7, 8, 17, 31, 33 and 41  
15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Klippel.  
16 Claims 9, 10, 34, and 42 stand rejected under 35 U.S.C. § 103(a) as being  
17 unpatentable over Klippel in view of U.S. Patent No. 4,223,181 to Simeau  
18 (hereinafter "Simeau"). Claims 11, 12, 24-28, 35, 36, 43, 44, 52-54 stand rejected  
19 under 35 U.S.C. § 103(a) as being unpatentable over Klippel in view of  
20 Raczynski, Bohdan, "Active Equalization of Loudspeakers" Speaker Builder, Feb.  
21 1997, pps. 8-12 (hereinafter "Bohdan").

22  
23 **The References**

24 **Klippel** describes a detector circuit which derives a motional signal of a  
25 transducer (displacement, velocity, acceleration) by sensing terminal voltage and

1 input current of the transducer only. The motional signal is used for adjusting an  
2 adaptive correction filter to compensate for the distortions of the transducer and to  
3 produce a desired transfer characteristic of the overall system. *See Klippel, Col. 3,*  
4 *Lines 38-44.* The main purpose of the invention of Klippel is to omit an additional  
5 acoustic or mechanic sensor which is expensive and affects the efficiency of the  
6 distortion reduction. *See Klippel, Col. 3, Lines 45-50.*

7 This objection is reached in Klippel by connecting a detector circuit  
8 between the output of the correction filter and the terminals of the transducer. *See*  
9 *Klippel, Col. 3, Line 60 to Col. 4, Line 2.* The detector circuit produces a motional  
10 signal (e.g. velocity) of the voice coil by modeling the electric input circuit of the  
11 transducer. The detector circuit is adaptive and determines the unknown model  
12 parameter (resistance and inductance of the voice coil, force factor B1) from the  
13 sensed motional signal on-line. A nonlinear subsystem compensates for the effect  
14 of the displacement varying force factor. The structure of the circuits and their  
15 connection is directly derived from a lumped parameter model of the  
16 electrodynamic transducer. *See Klippel, Col. 5, Lines 10-13.*

17 **Simeau** describes a signal processing device for audio frequency noise  
18 reduction. *See Simeau, Col. 1, Lines 9-10.* The signal processing device has an  
19 error channel which carries complimentary spectra signals, and a main channel  
20 which carries the other complimentary spectra signal. The transmission  
21 characteristics of the main channel are controlled by the signal carried by the error  
22 channel which controls the transition frequency. *See Simeau, Col. 2, Lines 39-45.*

23 **Bohdan** describe active equalization of loudspeakers. Particularly, Bohdan  
24 describes design trade-off and pitfalls of differing sizes of enclosures for a driver.  
25 *See Bohdan, Page 1.*

## The Claims

**Claim 1** has been amended, and as amended (portions of the amendment appear in bold italics) recites an apparatus for modifying an electrical audio signal for input to a sonic reproduction device that includes a speaker characterized by a plurality of individual responses which in combination define an overall response for the sonic reproduction device *which includes* frequency, time, phase *and* transient response, said apparatus comprising:

- a plurality of modification filters having modification responses that simulate the plurality of individual responses, at least one said modification filter simulating an individual component of the speaker, the modification filters for receiving the electrical audio signal, modifying the electrical audio signal and providing the electrical audio signal to the sonic reproduction device; and
- a plurality of adjustable parameters, each associated with at least one of the modification filters for allowing adjustments to the responses of the modification filters;
- wherein the adjustments create a plurality of individual conjugate responses, each individual conjugate response associated with at least one of the plurality of individual responses.

Support for this amendment can be found throughout the specification and drawings as filed, examples of which may be found at page 12 and beginning at page 14. Neither Klippel, nor any of the other submitted references, alone or in combination, disclose, teach, nor suggest “a plurality of individual responses which in combination define an overall response for the sonic reproduction device which includes frequency, time, phase and transient response” as claimed in claim 1. Accordingly, for at least this reason, this claim is allowable and withdrawal of the rejection is respectfully requested.

**Claims 2-12** depend either directly or indirectly from claim 1 and are allowable as depending from an allowable base claim. These claims are also

1 allowable for their own recited features which, in combination with those recited  
2 in claim 1, are neither shown nor suggested in the references of record, either  
3 singly or in combination with one another.

4 **Claim 13** has been amended and, as amended, recites a sound  
5 compensation system [portions of the amended language appear in bold italics  
6 below]. The sound compensation system is for altering an electrical audio signal  
7 for input to a sonic reproduction device including a speaker and *an enclosure*  
8 *which have* associated behavioral characteristic, said system comprising:

- 9 • a model of the sonic reproduction device having a plurality of filters that  
10 simulate at least one of the behavioral characteristics of the sonic  
11 reproduction device, each filter having an associated response that combine  
12 to define an overall response for the model, at least one said filter  
13 simulating an individual component of the speaker *and another said filter*  
14 *simulating the enclosure*, each response comprising at least one of a  
frequency, time, phase or transient response; and
- a controller that modifies the response of each of the plurality of filters to  
transform the filter into a conjugate filter having a response that is  
conjugate to the original response of the filter.

15 Support for this amendment can be found throughout the specification and  
16 drawings as filed, examples of which may be found at page 12 and beginning at  
17 page 14. Neither Klippel, nor any of the other submitted references, alone or in  
18 combination, disclose, teach, nor suggest “a sonic reproduction device including  
19 ... an enclosure” and a filter “simulating the enclosure” as claimed in claim 13.  
20 Accordingly, for at least this reason, this claim is allowable and withdrawal of the  
21 rejection is respectfully requested.

22 **Claims 14-28** depend either directly or indirectly from claim 13 and are  
23 allowable as depending from an allowable base claim. These claims are also  
24 allowable for their own recited features which, in combination with those recited  
25

1 in claim 13, are neither shown nor suggested in the references of record, either  
2 singly or in combination with one another.

3 **Claim 29** has been amended and, as amended, recites a sound system  
4 [portions of the amended language appear in bold italics below] comprising:

- 5 • a sonic reproduction device having associated mechanical, acoustic and  
6 electromagnetic behavioral characteristics;
- 7 • a source for outputting an electrical audio signal to a model of the sonic  
8 reproduction device, the model having a plurality of filters that simulate at  
9 least one of the mechanical, acoustic and electromagnetic behavioral  
10 characteristics of the sonic reproduction device, at least one said filter  
11 simulating an individual component of a speaker of the sonic reproduction  
12 device, ***the plurality of filters providing an overall response of the sonic  
reproduction device that includes*** frequency, time, phase ***and*** transient  
response, the model outputting the electrical audio signal to the sonic  
reproduction device; and
- a controller that modifies the responses of the filters to transform the model  
into a conjugate model having a plurality of filters with responses that  
comprise conjugates to the original response of the filter.

13 Support for this amendment can be found in the specification and drawings as  
14 filed, examples of which may be found at page 12 and beginning at page 14.

15 Neither Klippel, nor any of the other submitted references, alone or in  
16 combination, disclose nor suggest “the plurality of filters providing an overall  
17 response of the sonic reproduction device that includes frequency, time, phase and  
18 transient response” as claimed in claim 29. Accordingly, for at least this reason,  
19 this claim is allowable.

20 **Claims 30-36** depend either directly or indirectly from claim 29 and are  
21 allowable as depending from an allowable base claim. These claims are also  
22 allowable for their own recited features which, in combination with those recited  
23 in claim 29, are neither shown nor suggested in the references of record, either  
24 singly or in combination with one another.

1           **Claim 37** has been amended and, as amended, recites a method [portions of  
2 the amended language appear in bold italics below]. The method is for modifying  
3 an electrical audio signal for input to a sonic reproduction device having a speaker  
4 and ***an enclosure which are*** characterized by a plurality of individual responses  
5 which in combination define an overall response for the sonic reproduction device  
6 ***that includes*** frequency, time, phase ***and*** transient response, said method  
7 comprising the steps of:

- 8           • simulating the plurality of individual responses with a plurality of filters,  
9           wherein at least one said filter simulates an individual component of the  
10           speaker ***and another said filter simulates the enclosure***;
- 11           • adjusting the responses of the plurality of filters such that, for each filter,  
12           the adjusted response comprises a response that is a conjugate to one of the  
13           individual responses; and
- 14           • inputting the electrical audio signal to the filters.

15           Support for this amendment can be found throughout the specification and  
16           drawings as filed, examples of which may be found at page 12 and beginning at  
17           page 14. Neither Klippel, nor any of the other submitted references, alone or in  
18           combination, disclose “a sonic reproduction device having a speaker and an  
19           enclosure which are characterized by a plurality of individual responses which in  
20           combination define an overall response for the sonic reproduction device that  
21           includes frequency, time, phase and transient response” and “simulating the  
22           plurality of individual responses with a plurality of filters, wherein at least one  
23           said filter simulates an individual component of the speaker and another said filter  
24           simulates the enclosure”. Accordingly, for at least this reason, this claim is  
25           allowable.

26           **Claims 38-44** depend either directly or indirectly from claim 37 and are  
27           allowable as depending from an allowable base claim. These claims are also  
28           allowable for their own recited features which, in combination with those recited



1 in claim 37, are neither shown nor suggested in the references of record, either  
2 singly or in combination with one another.

3 **Claim 55** has been added and recites a sound compensation system for  
4 altering an electrical audio signal for input to a sonic reproduction device having  
5 associated behavioral characteristics, said system comprising a model of the sonic  
6 reproduction device having a plurality of filters that simulate behavioral  
7 characteristics of the sonic reproduction device, wherein:

- 8 • each said filter has an associated response that is combinable to define an  
9 overall response for the model; and
- 10 • at least one said filter, which corresponds to an individual component of the  
11 sonic reproduction device, is replaceable with another filter in response to  
12 replacement of the individual component of the sonic reproduction device  
13 with another individual component, wherein the other filter simulates a  
14 behavioral characteristic of the other individual component.

15 Support for this amendment can be found throughout the specification and  
16 drawings as filed, an example of which may be found at page 12. None of the  
17 submitted references, alone or in combination, disclose, teach or suggest the  
18 features of claim 55. Accordingly, for at least this reason, claim 55 is allowable.

19 **Claims 56-63** depend either directly or indirectly from claim 55 and are  
20 allowable as depending from an allowable base claim. These claims are also  
21 allowable for their own recited features which, in combination with those recited  
22 in claim 55, are neither shown nor suggested in the references of record, either  
23 singly or in combination with one another.

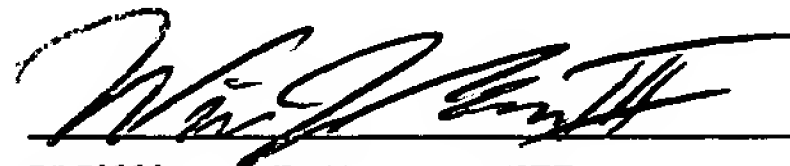
1 **Conclusion**

2 All of the claims are in condition for allowance. Accordingly, Applicant  
3 requests a Notice of Allowability be issued forthwith. If the Office's next  
4 anticipated action is to be anything other than issuance of a Notice of Allowability,  
5 Applicant respectfully requests a telephone call for the purpose of scheduling an  
6 interview.

7  
8 Respectfully Submitted,

9  
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